RED BLOOD CELLS FROM PATIENTS IN VOC REVERT TO A MORE NORMAL MORPHOLOGY FOLLOWING TREATMENT WITH SANGUINATE®

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Purpose

Vaso-Occlusive Crisis (VOC) is the physiological consequence of morphological changes in red blood cells (RBCs) within the microvasculature. A wide variety of factors can influence a VOC, but all events have the underlying molecular characteristics of low oxygen in RBCs promoting hemoglobin polymerization and shape change of the RBC. The loss of RBC circularity prevents the hypoxic cells from effectively flowing through the microvasculature and further exacerbates hypoxia downstream of the occlusion.

SANGUINATE® is a dual carbon monoxide/oxygen delivery agent that is in Phase II clinical trials in the ambulatory setting. The trial is intended to determine whether infusing SANGUINATE® during an acute VOC episode can reduce the need for IV opiates and prevent hospitalization. SANGUINATE® has been shown to revert SCD RBCs to a more normal morphology *in vitro*. Blood samples were collected in this clinical study to ascertain the impact of SANGUINATE® upon RBC morphology.

Methods

Whole blood samples were collected prior to infusion, at the time of patient discharge, and 72 hours post-infusion. Samples were shipped by priority overnight to Prolong Pharmaceuticals for imaging cytometry and shape analysis.

Results

SANGUINATE® infusion promoted a shift in the population of abnormally shaped cells to a more normal morphology, which is consistent with our earlier *in vitro* study results. This shape shift occurred within hours of infusion and was sustained up to the 72 hour sampling period. In contrast, no shift in cell morphology was observed in the placebo-treated patients.

Conclusion

SANGUINATE® infusion returns RBCs to a more normal shape in patients experiencing VOC. This change in shape was evident within 4-6 hours and was observed to persist at day 3 post

infusion. These results support the use of SANGUINATE® in this patient population to reduce opiate use and prevent hospitalization for VOC.